2022 IEEE 35th International Symposium on Computer-Based Medical Systems (CBMS 2022)

Shenzen, China
21-23 July 2022

IEEE Catalog Number: CFP22CBM-POD
ISBN: 978-1-6654-6771-1

Copyright © 2022 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP22CBM-POD
ISBN (Print-On-Demand):	978-1-6654-6771-1
ISBN (Online):	978-1-6654-6770-4
ISSN:	2372-918X

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

2022 IEEE 35th International Symposium on Computer-Based Medical Systems (CBMS)

CBMS 2022

Table of Contents

Preface to CBMS 2022 ..... **xix**
CBMS 2022 Organizing Committee ..... **xx**
CBMS 2022 Programme Committee ..... **xxi**

Session 1

Measuring the Left Ventricular Ejection Fraction Using Geometric Features 1
Athanasios Lagopoulos (University of Macedonia, Greece) and Dimitrios Hristu-Varsakelis (University of Macedonia, Greece)

REDIRECTION: Generating Drug Repurposing Hypotheses Using Link Prediction with DISNET Data. 7
Adrián Ayuso Muñoz (ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Spain; Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Spain), Esther Ugarte Carro (ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Spain; Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Spain), Lucía Prieto Santamaría (ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Spain; Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Spain; Ezeris Networks Global Services S.L., Spain), Belén Otero Carrasco (ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Spain; Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Spain), Ernestina Menasalvas Ruiz (ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Spain; Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Spain), Yuliana Pérez Gallardo (Ezeris Networks Global Services S.L., Spain), and Alejandro Rodríguez-González (ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Spain; Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Spain)

Deep Learning to Extract Breast Cancer Diagnosis Concepts 13
Oswaldo Solarte-Pabón (Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Spain), Maria Torrente (Hospital Universitario Puerta de Hierro, Spain), Alvaro Garcia-Barragán (Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Spain), Mariano Provencio (Hospital Universitario Puerta de Hierro, Spain), Ernestina Menasalvas (Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Spain), and Victor Robles (Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Spain)

Textural Features for Automatic Detection and Categorisation of Pneumonia in Chest X-ray Images 19
César A. Ortiz-Toro (Universidad Politécnica de Madrid, Spain), Angel García-Pedrero (Center for Biomedical Technology, Universidad Politécnica de Madrid, Spain), Mario Lillo-Saavedra (Facultad de Ingeniería Agrícola, Universidad de Concepcion, Chile), and Consuelo Gonzalo-Martín (Center for Biomedical Technology, Universidad Politécnica de Madrid, Spain)

Federated Cox Proportional Hazards Model with Multicentric Privacy-Preserving LASSO Feature Selection for Survival Analysis from the Perspective of Personalized Medicine 25
Carlotta Masciocchi (Fondazione Policlinico Universitario Agostino Gemelli (IRCCS), Italia), Benedetta Gottardelli (Universit `a Cattolica del Sacro Cuore, Italia), Mariachiara Savino (Universit `a Cattolica del Sacro Cuore, Italia), Luca Boldrini (Fondazione Policlinico Universitario Agostino Gemelli (IRCCS), Italia), Antonella Martino (Fondazione Policlinico Universitario Agostino Gemelli (IRCCS), Italia), Ciro Mazzarella (Fondazione Policlinico Universitario Agostino Gemelli (IRCCS), Italia), Mariangela Massaccesi (Fondazione Policlinico Universitario Agostino Gemelli (IRCCS), Italia), Vincenzo Valentini (Fondazione Policlinico Universitario Agostino Gemelli (IRCCS), Italia), and Andrea Damiani (Fondazione Policlinico Universitario Agostino Gemelli (IRCCS), Italia)

FLICU: A Federated Learning Workflow for Intensive Care Unit Mortality Prediction 32
Lena Mondrejevski (Stockholm University, Sweden), Ioanna Miliou (Stockholm University, Sweden), Annaclaudia Montanino (Research & Business Development, Getinge, Sweden), David Pitts (Research & Business Development, Getinge, Sweden), Jaakko Hollmén (Stockholm University, Sweden), and Panagiotis Papapetrou (Stockholm University, Sweden)

Session 2

Predicting Tacrolimus Exposure in Kidney Transplanted Patients Using Machine Learning 38
Andrea M. Storås (SimulaMet, Norway; Oslo Metropolitan University, Norway), Anders Åsberg (Oslo University Hospital, Norway; University of Oslo, Norway), Pål Halvorsen (SimulaMet, Norway; Oslo Metropolitan University, Norway), Michael A. Riegler (SimulaMet, Norway; UiT The Arctic University of Norway, Norway), and Inga Strümke (SimulaMet, Norway; Norwegian University of Science and Technology, Norway)

Estimating Predictive Uncertainty in Gastrointestinal Polyp Segmentation 44
Felicia Jacobsen (University of Oslo, Norway; Simula Metropolitan Center for Digital Engineering, Norway), Steven Hicks (Simula Metropolitan Center for Digital Engineering, Norway), Pål Halvorsen (Simula Metropolitan Center for Digital Engineering, Norway; Oslo Metropolitan University, Norway), and Michael Riegler (Simula Metropolitan Center for Digital Engineering, Norway; UiT - Arctic University of Norway, Norway)

A Novel CNN Model with Dense Connectivity and Attention Mechanism for Arrhythmia Classification 50
Qin Zhan (South China University of Technology), Peilin Li (South China University of Technology), Yongle Wu (South China University of Technology), Jingchun Huang (South China University of Technology), and Xunde Dong (South China University of Technology)

Generic Concept for Integrating Voice Assistance Into Smart Therapeutic Interventions 56
Jens Scheible (Institute of Databases and Information Systems, Ulm University, Germany), Fabian Hofmann (Institute of Databases and Information Systems, Ulm University, Germany), Manfred Reichert (Institute of Databases and Information Systems, Ulm University, Germany), Rüdiger Pryss (Institute of Clinical Epidemiology and Biometry, University of Wurzburg, Germany), and Marc Schickler (Institute of Databases and Information Systems, Ulm University, Germany)

Combining Heterogeneous Patient-Level Data Into tranSMART to Support Multicentre Studies . 62
João Rafael Almeida (DETI/IEETA, University of Aveiro, Portugal; University of A Coruña, Spain), Luís Bastião Silva (BMD Software, Portugal), Alejandro Pazos (University of A Coruña, Spain), and José Luís Oliveira (DETI/IEETA, University of Aveiro, Portugal; BMD Software, Portugal)

PolypConnect: Image Inpainting for Generating Realistic Gastrointestinal Tract Images with Polyps 66
Andre Fagereng (Oslo Metropolitan University, Norway), Vajira Thambawita (SimulaMet, Norway), Andrea M. Storås (SimulaMet, Norway), Sravanthi Parasa (Swedish Medical Group, USA), Thomas de Lange (Sahlgrenska University Hospital, Sweden), Pål Halvorsen (SimulaMet, Norway), and Michael A. Riegler (SimulaMet, Norway)

Session 3

Wia-Spine: A CBIR Environment with Embedded Radiomic Features to Assess Fragility Fractures 72
Marcos Bedo (University of São Paulo, Brazil), Jonathan S. Ramos (University of São Paulo, Brazil), Agma J. M. Traina (University of São Paulo, Brazil), Caetano Traina Jr. (University of São Paulo, Brazil), Marcello H. Nogueira-Barbosa (University of São Paulo, Brazil), and Paulo M. Azevedo-Marques (University of São Paulo, Brazil)

Analysis of Vertebrae Without Fracture on Spine MRI to Assess Bone Fragility: A Comparison of Traditional Machine Learning and Deep Learning 78
Jonathan Ramos (Institute of Mathematics and Computer Science (ICMC), University of São Paulo), Erikson Aguiar (Institute of Mathematics and Computer Science (ICMC), University of São Paulo), Ivar Belizario (Institute of Mathematics and Computer Science (ICMC), University of São Paulo), Márcus Costa (Institute of Mathematics and Computer Science (ICMC), University of São Paulo), Jamilly Maciel (Ribeirao Preto Medical School (FMRP), University of São Paulo), Mirela Cazzolato (Institute of Mathematics and Computer Science (ICMC), University of São Paulo), Caetano Jr. Traina (Institute of Mathematics and Computer Science (ICMC), University of São Paulo), Marcello Nogueira-Barbosa (Ribeirao Preto Medical School (FMRP), University of São Paulo, Brazil), and Agma Traina (Institute of Mathematics and Computer Science (ICMC), University of São Paulo, Brazil)

CNN Optimization using Surrogate Evolutionary Algorithm for Breast Cancer Detection Using Infrared Images 84
Caroline Barcelos Gonçalves (Federal University of Uberlandia, Brazil), Jefferson Souza (Federal University of Uberlandia, Brazil), and Henrique Fernandes (Federal University of Uberlandia, Brazil)

Hyperparameter for Deep Learning Applied in Mammogram Image Classification 90
Juliana Wolf Pereira (Federal University of São Carlos, Brazil) and Marcela Xavier Ribeiro (Federal University of São Carlos, Brazil)

Deep Learning Based Multi-label Prediction of Hospitalization for COVID-19 Cases 96
Carson K. Leung (University of Manitoba, Canada), Thanh Huy Daniel Mai (University of Manitoba, Canada), and Nguyen Duy Thong Tran (University of Manitoba, Canada)

Breast Cancer Diagnosis from Histopathology Images Using Supervised Algorithms 102
Alberto Labrada (University of Bridgeport, USA) and Buket Barkana (University of Bridgeport, USA)

Study of Vocal Muscle Strain with Skin Deformation Tracking System 108
Steven Hogue (University of Texas at Dallas, USA), Adrianna Shembel (University of Texas at Dallas, USA; UT Southwestern, USA), and Xiaohu Guo (University of Texas at Dallas, USA)

Focal Loss Improves Performance of High-Sensitivity C-Reactive Protein Imbalanced Classification 114
Ryan Sledzik (Central Connecticut State University, USA) and Mahdieh Zabihimayvan (Central Connecticut State University, USA)

Session 4

MobApp4InfectiousDisease: Classify Covid-19, Pneumonia, and Tuberculosis 119
Md. Kawsher Mahbub (Bangladesh University of Business and Technology (BUBT), Bangladesh), Md. Zakir Hossain Zamil (Bangladesh University of Business and Technology (BUBT), Bangladesh), Md. Abdul Mozid Miah (Bangladesh University of Business and Technology (BUBT), Bangladesh), Partho Ghose (Bangladesh University of Business and Technology (BUBT), Bangladesh), Milon Biswas (Bangladesh University of Business and Technology (BUBT), Bangladesh), and KC Santosh (University of South Dakota, USA)

Graph-Based Regional Feature Enhancing for Abdominal Multi-organ Segmentation in CT 125
Zefan Yang (Shenzhen University, China) and Yi Wang (Shenzhen University, China)

TSEUnet: A 3D Neural Network with Fused Transformer and SE-Attention for Brain Tumor Segmentation 131
Yanmei Chen (Soochow University, China) and Jiajun Wang (Soochow University, China)

Left and Right Ventricular Segmentation Based on 3D Region-Aware U-Net 137
Xiaoting Huang (Shenzhen University, China), Wenjie Chen (Shenzhen University, China), Xueting Liu (Shenzhen University, China), Huisi Wu (Shenzhen University, China), Zhenkun Wen (Shenzhen University, China), and Linlin Shen (Shenzhen University, China)

Ultrasonic Carotid Blood Flow Velocimetry Based on Deep Complex Neural Network 143
Jian Lei (Yunnan University, China), Xun Lang (Yunnan University, China), Bingbing He (Yunnan University, China), Songhua Liu (Yunnan University, China), Hao Tan (Yunnan University, China), and Yufeng Zhang (Yunnan University, China)

Dual Fusion Mass Detector for Mammogram Mass Detection 149
Shuo Liu (Shenzhen University), Zhihui Lai (Shenzhen University), Heng Kong (BaoAn Central Hospital of Shenzhen), and Linlin Shen (Shenzhen University)

ECG Heartbeat Classification Based on Combined Features Extracted by PCA, KPCA, AKPCA and DWT 155
Junhao Zhu (South China University of Technology), Yi Zeng (South China University of Technology), Jianheng Zhou (South China University of Technology), and Xunde Dong (South China University of Technology)

A Goal-Driven Approach for Clinical Decision Conflict Detection and Its Application to the Treatment of Multimorbidity 160
Yunlong Ye (Hubei University of Technology, China) and Liang Xiao (Hubei University of Technology, China)

Session 5

Online Reconstruction of Fast Dynamic MR Imaging Using Deep Low-Rank Plus Sparse Network ... 166
Che Wang (Chongqing University of Technology, China), Jia Sen (Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China), Zhonghong Yan (Chongqing University of Technology, China), Yijia Zheng (Chongqing University of Technology, China), Shaonan Liu (Inner Mongolia University, China), Haifeng Wang (Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China), Dong Liang (Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China), and Yanjie Zhu (Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, China; National Center for Applied Mathematics Shenzhen(NCAMS), China)

Explanations of Deep Networks on EEG Data via Interpretable Approaches 171
Chen Cui (College of Computer Science and Software Engineering, Shenzhen University, China), Ying Zhang (College of Computer Science and Software Engineering, Shenzhen University, China), and Shenghua Zhong (College of Computer Science and Software Engineering, Shenzhen University, China)

Generative Adversarial Networks for Augmenting EEG Data in P300-Based Applications: A Comparative Study 177
Yasmin Abdelghaffar (German University in Cairo, Egypt), Ahmed Hashem (German University in Cairo, Egypt), and Seif Eldawlatly (Ain Shams University; German University in Cairo, Egypt)

A YOLO-Based Object Simplification Approach for Visual Prostheses 183
Reham Elnabawy (German University in Cairo, Egypt), Slim Abdennadher (German University in Cairo; German International University, Egypt), Olaf Hellwich (Technische Universität Berlin, Germany), and Seif Eldawlatly (Ain Shams University; German University in Cairo, Egypt)

Ethically Informed Software Process for Smart Health Home 187
Xiang Zhang (University of Nottingham Ningbo China, China), Matthew Pike (University of Nottingham Ningbo China, China), Nasser Mustafa (Wenzhou-Kean University, China), and Vladimir Brusic (University of Nottingham Ningbo China, China)

A Drug Repositioning Approach using Drug and Disease Features 193
Jialan Tang (Shenzhen University, China), Baiying Lei (Shenzhen University, China), and Weilin Chen (Shenzhen University, China)

Leveraging Clinical BERT in Multimodal Mortality Prediction Models for COVID-19 199
Yash Pawar (Stockholm University, Sweden), Aron Henriksson (Stockholm University, Sweden), Pontus Hedberg (Karolinska Institutet, Sweden; Karolinska University Hospital, Sweden), and Pontus Naucler (Karolinska Institutet, Sweden; Karolinska University Hospital, Sweden)

The Impact of General Data Protection Regulation on the Australasian Type-1 Diabetes Platform 205
Zhe Wang (The University of Melbourne, Australia), Anthony Stell (The University of Melbourne, Australia), Richard Sinnott (The University of Melbourne, Australia), and ADDN Study Group ADDN Study Group (The University of Melbourne, Australia)

Session 6

Exploiting AI to Make Insulin Pens Smart: Injection Site Recognition and Lipodystrophy Detection 211
Elisabetta Torre (Università Campus Bio-Medico di Roma, Italy), Luisa Francini (Università Campus Bio-Medico di Roma, Italy), Ermanno Cordelli (Università Campus Bio-Medico di Roma, Italy), Rosa Sicilia (Università Campus Bio-Medico di Roma, Italy), Silvia Manfrini (Fondazione Policlinico Universitario Campus Bio-Medico, Italy), Vincenzo Piemonte (Università Campus Bio-Medico di Roma, Italy), and Paolo Soda (Università Campus Bio-Medico di Roma, Italy)

Integrating Residual, Dense, and Inception Blocks into the nnUNet 217
Niccolo McConnell (Brunel University London, UK), Alina Miron (Brunel University London, UK), Zidong Wang (Brunel University London, UK), and Yongmin Li (Brunel University London, UK)

ConvNet and Machine Learning Models with Feature Engineering Using Motor Activity Data for Schizophrenia Classification 223
Fellipe Paes Ferreira (Munster Technological University - MTU, Ireland) and Aengus Daly (Munster Technological University - MTU, Ireland)

Prediction of Declining Engagement to Self-Monitoring Apps on the Example of Tinnitus mHealth Data 228
Miro Schleicher (Knowledge Management & Discovery Lab, Otto-von-Guericke University Magdeburg, Germany), Sebastian Hamacher (Otto-von-Guericke University Magdeburg, Germany), Mats Naujoks (Otto-von-Guericke University Magdeburg, Germany), Kolja Günther (Otto-von-Guericke University Magdeburg, Germany), Timo Schmidt (Otto-von-Guericke University Magdeburg, Germany), Rüdiger Pryss (Institute of Clinical Epidemiology and Biometry, University of Würzburg, Germany), Johannes Schobel (Institute DigiHealth, Neu-Ulm University of Applied Sciences, Germany), Winfried Schlee (Department of Psychiatry and Psychotherapy, University of Regensburg, Germany), and Myra Spiliopoulou (Knowledge Management & Discovery Lab, Otto-von-Guericke University Magdeburg, Germany)

Predicting the Onset of Delirium on Hourly Basis in an Intensive Care Unit Following Cardiac Surgery 234
Linda Lapp (University of Strathclyde, UK), Marc Roper (University of Strathclyde, UK), Kimberley Kavanagh (University of Strathclyde, UK), and Stefan Schraag (Golden Jubilee National Hospital, UK)

Analysing Out-Patient Demand and Forecasting Theatre Requirements in a Teaching Hospital 240
Ian Darbey (Dublin City University, Ireland) and Bridget Kane (Karlstad University, Sweden)

Session 7

Deep Model for Anticancer Drug Response Through Genomic Profiles and Compound Structures . 246
Filipa Carvalho (Univ Coimbra, Centre for Informatics and Systems of the University of Coimbra, Portugal), Maryam Abbasi (Univ Coimbra, Centre for Informatics and Systems of the University of Coimbra, Portugal), Bernardete Ribeiro (Univ Coimbra, Centre for Informatics and Systems of the University of Coimbra, Portugal), and Joel P. Arrais (Univ Coimbra, Centre for Informatics and Systems of the University of Coimbra, Portugal)

Attention-Driven Spatial Transformer Network for Abnormality Detection in Chest X-Ray Images 252
Joana Rocha (INESC-TEC, University of Porto, Portugal), Sofia Cardoso Pereira (INESC-TEC, University of Porto, Portugal), João Pedrosa (INESC-TEC, University of Porto, Portugal), Aurélio Campilho (INESC-TEC, University of Porto, Portugal), and Ana Maria Mendonça (INESC-TEC, University of Porto, Portugal)

Exploring LRP and Grad-CAM Visualization to Interpret Multi-label-Multi-class Pathology Prediction using Chest Radiography 258
Mahbub Ul Alam (Stockholm University, Sweden), Jón Rúnar Baldvinsson (Skatturinn (Iceland Revenue and Customs), Iceland), and Yuxia Wang (Qamcom Research and Technology, Sweden)

Visualising Time-Evolving Semantic Biomedical Data 264
Arnaldo Pereira (University of Aveiro, Portugal), João Rafael Almeida (University of Aveiro, Portugal; University of A Coruña, Spain), Rui Pedro Lopes (Polytechnic Institute of Bragança, Portugal), and José Luís Oliveira (University of Aveiro, Portugal)

Investigating the Effectiveness of Color Coding in Multimodal Medical Imaging 270
Giuseppe Placidi (University of L'Aquila, Italy), Giovanna Castellano (University of Bari Aldo Moro, Italy), Filippo Mignosi (DISIM, University of L'Aquila, Italy), Matteo Polsinelli (University of L'Aquila, Italy), and Gennaro Vessio (University of Bari Aldo Moro, Italy)

The Value of Compression for Taxonomic Identification 276
Jorge Miguel Silva (IEETA, DETI, University of Aveiro, Portugal) and João Rafael Almeida (IEETA, DETI, University of Aveiro, Portugal; Department of Information and Communications Technologies, University of A Coruna, Spain)

Session 8

Diabetic Foot Ulcers Classification Using a Fine-Tuned CNNs Ensemble 282
Elineide Santos (Universidade Federal do Piauí, Brasil), Francisco Santos (Universidade Federal do Piauí, Brasil), João Dallyson (Universidade Federal do Maranhão, Brasil), Kelson Aires (Universidade Federal do Piauí, Teresina, Brasil), João Manuel Tavares (Instituto de Ciência e Inovação em Engenharia Mecânica e Engenharia Industrial, Universidade do Porto, Portugal), and Rodrigo Veras (Universidade Federal do Piauí, Brasil)

Data Augmentation Methods for Object Detection and Segmentation in Ultrasound Scans: An Empirical Comparative Study 288
Sachintha Brandigampala (University of California, San Diego, USA), Abdullah Al-Battal (University of California, San Diego, USA; King Fahd University of Petroleum and Minerals, Saudi Arabia), and Truong Nguyen (University of California, San Diego, USA)

MRI-Guided Automated Delineation of Gross Tumor Volume for Nasopharyngeal Carcinoma Using Deep Learning 292
Meiyan Yue (Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China), Zhenhui Dai (Department of Radiation Therapy, The Second Affiliated Hospital, Guangzhou University of Chinese Medicine, China), Jiahui He (Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China), Yaoqin Xie (Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China), Nazar Zaki (United Arad Emirates University, United Arab Emirates), and Wenjian Qin (Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China)

Aerobic Exercise System for Home Telerehabilitation 297
Aref Smiley (Icahn School of Medicine at Mount Sinai, USA) and Joseph Finkelstein (Icahn School of Medicine at Mount Sinai, USA)

Magnitude-Image Based Data-Consistent Deep Learning Method for MRI Super Resolution 302
Ziyan Lin (Shanghai Starriver Bilingual School, China) and Zihao Chen (University of California, Los Angeles, USA)

Penalized Entropy: A Novel Loss Function for Uncertainty Estimation and Optimization in Medical Image Classification 306
Dehua Feng (Xi'an Jiaotong University, China), Xi Chen (Xi'an Jiaotong University, China), Xiaoyu Wang (Xi'an Jiaotong University, China), Jiahuan Lv (Xi'an Jiaotong University, China), Ling Bai (The Second Affiliated Hospital of Xi'an Jiaotong University, China), Shu Zhang (The Second Affiliated Hospital of Xi'an Jiaotong University, China), and Zhiguo Zhou (The University of Kansas Medical Center, US)

Session 9

Facial Pore Segmentation Algorithm using Shallow CNN 311
Sunyong Seo (AI R&D Center, LuluLab, Republic of Korea), Sangwook Yoo (AI R&D Center, LuluLab, Republic of Korea), Semin Kim (AI R&D Center, LuluLab, Republic of Korea), Daeun Yoon (AI R&D Center, LuluLab, Republic of Korea), and Jongha Lee (AI R&D Center, LuluLab, Republic of Korea)

Automatic Polyp Segmentation with Multiple Kernel Dilated Convolution Network 317
Nikhil Kumar Tomar (Indira Gandhi National Open University), Abhishek Srivastava (Computer Vision and Pattern Recognition Unit, Indian Statistical Institute), Ulas Bagci (Machine and Hybrid Intelligence Lab, Northwestern University, USA), and Debesh Jha (Machine and Hybrid Intelligence Lab, Northwestern University, USA)

Video Capsule Endoscopy Classification using Focal Modulation Guided Convolutional Neural Network 323
Abhishek Srivastava (Computer Vision and Pattern Recognition Unit, Indian Statistical Institute), Nikhil Kumar Tomar (Indira Gandhi National Open University), Ulas Bagci (Machine and Hybrid Intelligence Lab, Northwestern University, USA), and Debesh Jha (Machine and Hybrid Intelligence Lab, Northwestern University, USA)

Automatic Detection of Prostate Cancer Systemic Lesions Based on Deep Learning and ^68Ga-PSMA-11 PET/CT 329
Shaonan Zhong (Medical AI Lab, Shenzhen University, China), Yuxuan Wu (Medical AI Lab, Shenzhen University, China), Zhantao Liu (Medical AI Lab, Shenzhen University, China), Zhaohong Pan (Medical AI Lab, Shenzhen University, China), Bingsheng Huang (Medical AI Lab, Shenzhen University, China), and Qinqin Yang (The First Affiliated Hospital of Naval Medical University, China)

Policy-Based Diabetes Detection using Formal Runtime Verification Monitors 333
Abhinandan Panda (IIT Bhubaneswar, India), Srinivas Pinisetty (IIT Bhubaneswar, India), and Partha Roop (University of Auckland, New Zealand)

Breast Lesions Segmentation using Dual-Level UNet (DL-UNet) 339
Yanjiao Zhao (Shenzhen University; Shenzhen Institute of Artificial Intelligence and Robotics for Society), Zhihui Lai (Shenzhen University; Shenzhen Institute of Artificial Intelligence and Robotics for Society), Linlin Shen (Shenzhen University; Shenzhen Institute of Artificial Intelligence and Robotics for Society), and Heng Kong (BaoAn Central Hospital of Shenzhen)

Session 10

Ensemble Framework for Unsupervised Cervical Cell Segmentation 345
Agnimitra Sen (Jadavpur University, India), Shyamali Mitra (Jadavpur University, India), Sukanta Chakraborty (Theism Medical Diagnostics Centre, India), Debashri Mondal (Theism Medical Diagnostics Centre, India), KC Santosh (Applied AI Research Lab, University of South Dakota, USA), and Nibaran Das (Jadavpur University, India)

Integrating with Segmentation by using Multi-task Learning Improves Classification Performance in Medical Image Analysis 351
Yi Li (Shenzhen University, China), Yuanyuan Zhao (Shenzhen University, China), Mingyu Wang (Shenzhen University, China), Fei Li (Shenzhen University, China), Jia Chen (Shenzhen Institute for Drug Control, China), Yanji Luo (The First Affiliated Hospital of Sun Yat-sen University, China), Shi-Ting Feng (The First Affiliated Hospital of Sun Yat-sen University, China), Xiaoyi Lin (Shenzhen Second People's Hospital, China), and Bingsheng Huang (Shenzhen University, China)

Learning Pre- and Post-Contrast Representation for Breast Cancer Segmentation in DCE-MRI 355
Hong Wu (Shenzhen University, China), Yingwen Huo (Shenzhen University, China), Yupeng Pan (Shenzhen University, China), Zeyan Xu (Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, China), Rian Huang (Shenzhen University, China), Yu Xie (The Third Affiliated Hospital of Kunming Medical University, China), Chu Han (Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, China), Zaiyi Liu (Guangdong Provincial People's Hospital, Guangdong Academy of Medical Sciences, China), and Yi Wang (Shenzhen University, China)

Optimum Thresholding for Medical Brain Images Based on Tsallis Entropy and Bayesian Estimation 360
Sijin Luo (Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China; University of Chinese Academy of Sciences, China), Zhehao Luo (Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China; University of Chinese Academy of Sciences, China), Zhiyong Zhan (Nanjing University, China), and Guoyuan Liang (Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China; University of Chinese Academy of Sciences, China; Chinese Academy of Sciences, China)

TcT: Temporal and Channel Transformer for EEG-Based Emotion Recognition 366
Yanling Liu (Nanjing University of Aeronautics and Astronautics, China), Yueying Zhou (Nanjing University of Aeronautics and Astronautics, China), and Daoqiang Zhang (Nanjing University of Aeronautics and Astronautics, China)

Deep Log-Normal Label Distribution Learning for Pneumoconiosis Staging on Chest Radiographs 372
Wenjian Sun (University of Electronic Science and Technology of China, China), Dongsheng Wu (West China Fourth Hospital, China; West China-PUMC C.C. Chen Institute of Health, China), Yang Luo (University of Electronic Science and Technology of China, China), Lu Liu (West China Fourth Hospital, China), Hongjing Zhang (West China Fourth Hospital, China), Shuang Wu (West China Fourth Hospital, China), Yan Zhang (West China Fourth Hospital, China), Chenglong Wang (West China Fourth Hospital, China), Houjun Zheng (West China Fourth Hospital, China), Jiang Shen (West China Fourth Hospital, China; West China-PUMC C.C. Chen Institute of Health, China), and Chunbo Luo (University of Electronic Science and Technology of China, China)

Session 11

Contrastive Learning-Based Adenoid Hypertrophy Grading Network using Nasoendoscopic Image 377
Siting Zheng (Shenzhen University, China; AI Research Center for Medical Image Analysis & Diagnosis, Shenzhen University, China), Xuechen Li (AI Research Center for Medical Image Analysis & Diagnosis, Shenzhen University, China; National Engineering Laboratory for Big Data System Computing Technology, Shenzhen University, China), Mingmin Bi (The Seventh Affiliated Hospital of Sun Yat-sen University, China), Yuxuan Wang (Shenzhen University, China; AI Research Center for Medical Image Analysis & Diagnosis, Shenzhen University, China), Haiyan Liu (The Seventh Affiliated Hospital of Sun Yat-sen University, China), Xiaoshan Feng (The Seventh Affiliated Hospital of Sun Yat-sen University, China), Yunping Fan (The Seventh Affiliated Hospital of Sun Yat-sen University, China), and Linlin Shen (Shenzhen University, China; AI Research Center for Medical Image Analysis & Diagnosis, Shenzhen University, China)

Semi-Automatic Labeling and Training Strategy for Deep Learning-Based Facial Wrinkle Detection 383
Semin Kim (AI R&D Center, lululab Inc., South Korea), Huisu Yoon (AI R&D Center, lululab Inc., South Korea), Jongha Lee (AI R&D Center, lululab Inc., South Korea), and Sangwook Yoo (AI R&D Center, lululab Inc., South Korea)

End-to-End Multi-task Learning Regression Network for Fovea Localization in Fundus Images . 389
Limin Huang (Shenzhen University, China), Haijun Lei (Shenzhen University, China), Weixin Liu (Shenzhen University, China), Zhen Li (Nanjing University of Aeronautics and Astronautics, China), Hai Xie (Shenzhen University, China), and Baiying Lei (Shenzhen University, China)

Towards Clinical Hyperspectral Imaging (HSI) Standards: Initial Design for a Microneurosurgical HSI Database 394
Sami Puustinen (University of Eastern Finland), Joni Hyttinen (University of Eastern Finland), Gemal Hisuin (University of Eastern Finland), Hana Vrzáková (University of Eastern Finland), Antti Huotarinen (Kuopio University Hospital), Pauli Fält (University of Eastern Finland), Markku Hauta-Kasari (University of Eastern Finland), Arto Immonen (Kuopio University Hospital), Timo Koivisto (Kuopio University Hospital), Juha E Jääskelainen (Kuopio University Hospital), and Antti-Pekka Elomaa (Kuopio University Hospital)

Towards Evidence-Based Argumentation Graph for Clinical Decision Support 400
Liang Xiao (Hubei University of Technology, China)

Patient Identification Methods Based on Medical Imagery and Their Impact on Patient Privacy and Open Medical Data 406
Laura Carolina Martínez Esmeral (Paris Lodron University of Salzburg, Austria) and Andreas Uhl (Paris Lodron University of Salzburg, Austria)

Session 12

MRI Quality Control Algorithm Based on Image Analysis using Convolutional and Recurrent Neural Networks 412
Grigorii Shoroshov (Lomonosov Moscow State University, Russia), Olga Senyukova (Lomonosov Moscow State University, Russia), Dmitry Semenov (Center of Diagnostics and Telemedicine, Russia), and Daria Sharova (Center of Diagnostics and Telemedicine, Russia)

Classification of Cardiac Cohorts Based on Morphological and Hemodynamic Features Derived from 4D PC-MRI Data 416
Uli Niemann (Otto von Guericke University Magdeburg, Germany), Atrayee Neog (Otto von Guericke University Magdeburg, Germany), Benjamin Behrendt (Otto von Guericke University Magdeburg, Germany), Kai Lawonn (University of Jena, Germany), Matthias Gutberlet (University of Leipzig, Germany), Myra Spiliopoulou (Otto von Guericke University Magdeburg, Germany), Bernhard Preim (Otto von Guericke University Magdeburg, Germany), and Monique Meuschke (Otto von Guericke University Magdeburg, Germany)

Subgroup Discovery Analysis of Treatment Patterns in Lung Cancer Patients 422
Daniel Gómez-Bravo (Universidad Politécnica de Madrid, Spain), Aaron García (Universidad Politécnica de Madrid, Spain), Guillermo Vigueras (Universidad Politécnica de Madrid, Spain), Belén Ríos Sánchez (Universidad Politécnica de Madrid, Spain), Belén Otero (Universidad Politécnica de Madrid, Spain), Roberto Hernández (Hospital Universitario Puerta de Hierro de Madrid, Spain), María Torrente (Hospital Universitario Puerta de Hierro de Madrid, Spain), Ernestina Menasalvas (Universidad Politécnica de Madrid, Spain), Mariano Provencio (Hospital Universitario Puerta de Hierro de Madrid, Spain), and Alejandro Rodríguez González (Universidad Politécnica de Madrid, Spain)

Evaluation of Relevance-Driven Compression of Regular Cataract Surgery Videos 429
Natalia Mathá (Institute of Information Technology, Klagenfurt University, Austria), Klaus Schoeffmann (Institute of Information Technology, Klagenfurt University, Austria), Stephanie Sarny (Department of Ophthalmology, Klinikum Klagenfurt, Austria; Department of Ophthalmology, Medical University Graz, Austria), Doris Putzgruber-Adamitsch (Department of Ophthalmology, Klinikum Klagenfurt, Austria), and Yosuf El-Shabrawi (Department of Ophthalmology, Klinikum Klagenfurt, Austria; Department of Ophthalmology, Medical University Graz, Austria)

Drug Repositioning with Gender Perspective Focused on Adverse Drug Reactions 435
Belén Otero Carrasco (Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Spain), Aurora Pérez Pérez (ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Spain), Ernestina Menasalvas Ruiz (Centro de Tecnología Biomédica, ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Spain), Juan Pedro Caraça-Valente Hernández (ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Spain), Lucía Prieto Santamaría (Centro de Tecnología Biomédica, Universidad Politécnica de Madrid, Spain), and Alejandro Rodríguez-González (Centro de Tecnología Biomédica, ETS Ingenieros Informáticos, Universidad Politécnica de Madrid, Spain)

Optimizing Nozzle Travel Time in Proton Therapy 441
Matteo Spezialetti (University of L'Aquila, Italy), Renata Di Filippo (University of L'Aquila, Italy), Ramon Gimenez De Lorenzo (Medical Physics Unit, San Salvatore Hospital, ASL1, Italy), Giovanni Luca Gravina (University of L'Aquila, Italy), Giuseppe Placidi (University of L'Aquila, Italy), Guido Proietti (University of L'Aquila, Italy), Fabrizio Rossi (University of L'Aquila, Italy), Stefano Smriglio (University of L'Aquila, Italy), João Manuel R.S. Tavares (Universidade do Porto, Portugal), Francesca Vittorini (Medical Physics Unit, San Salvatore Hospital, ASL1, Italy), and Filippo Mignosi (University of L'Aquila, Italy; ICAR-CNR, Italy)

Doctoral Consortium

A Secure Architecture for Exploring Patient-Level Databases from Distributed Institutions 447
João Rafael Almeida (IEETA, DETI, University of Aveiro, Portugal; University of A Coruña, Spain), João Paulo Barraca (IT, DETI, University of Aveiro, Portugal), and José Luís Oliveira (IEETA, DETI, University of Aveiro, Portugal)

Experiences in Development and Support of a Multi-technology Skin Conditions Clinical Trial Platform 453
Richard Sinnott (University of Melbourne, Australia) and William Hu (University of Melbourne, Australia)

Touchless Authentication for Health Professionals: Analyzing the Risks and Proposing Alternatives to Dirty Interfaces 459
Chiarelli Araújo Vale (Federal University of Santa Catarina, Brazil), Frederico Schardong (Federal Institute of Rio Grande do Sul, Brazil), Maurício Barros (Federal University of Santa Catarina, Brazil), and Ricardo Custódio (Federal University of Santa Catarina, Brazil)

Fine-Grained Encryption for Secure Research Data Sharing 465
Lúcio H.A. Reis (Amsterdam UMC location University of Amsterdam, Netherlands; Amsterdam Public Health and Methodology Amsterdam, The Netherlands), Marcela T. de Oliveira (Amsterdam UMC location University of Amsterdam, Netherlands; Amsterdam UMC location University of Amsterdam, Netherlands; Amsterdam Public Health and Methodology Amsterdam, The Netherlands), and Silvia D. Olabarriaga (Amsterdam UMC location University of Amsterdam, Netherlands; Amsterdam Public Health and Methodology Amsterdam, The Netherlands)

Author Index **471**